

CLAIMS

What is claimed is:

1. A method for performing closed-chest surgery on a patient to connect a graft vessel to target vessels, comprising:

creating at least one point of entry into the thoracic cavity;
performing a sutureless proximal anastomosis between the graft vessel and one target vessel, utilizing a tool inserted through one opening;
gaining access to a distal anastomotic site; and
performing a sutureless distal anastomosis between the graft vessel and another target vessel with at least one tool, wherein each said tool enters the thoracic cavity only through at least one point of entry.

2. The method of claim 1, wherein said performing a sutureless distal anastomosis comprises:

attaching the graft vessel to the target vessel; and
creating an opening in the target vessel.

3. The method of claim 1, wherein said attaching comprises stapling the graft vessel to the tensioned portion of the target vessel.

4. The method of claim 1, wherein said performing a sutureless distal anastomosis comprises inserting an anvil through the wall of the target vessel into the lumen of the target vessel.

5. The method of claim 4, further comprising moving said anvil against the wall of the target vessel.

6. The method of claim 1, wherein said performing a sutureless proximal anastomosis comprises:

placing an end of a tool substantially normal to the target vessel, said tool holding the graft vessel; and

deploying an anastomosis device to attach the graft vessel to the target vessel.

7. The method of claim 6, further comprising splitting said tool to release the graft vessel.

8. The method of claim 1, wherein said creating comprises utilizing a sub-xyphoid approach.

9. The method of claim 1, wherein said creating comprises utilizing an intercostal approach.

10. The method of claim 1, further comprising measuring the distance between the proximal anastomosis site and the distal anastomotic site with a vein measuring device inserted through at least one point of entry into the thoracic cavity.

11. The method of claim 1, wherein said creating is performed with a tool comprising a trocar port.

12. The method of claim 1, wherein said gaining access comprises creating an opening in the pericardium, wherein the opening extends substantially from the aorta to the apex of the heart.

13. The method of claim 1, wherein said gaining access comprises accessing the intrapericardial space.

14. The method of claim 1, wherein said performing sutureless distal anastomosis further comprises attaching a clamp assembly to the distal end of the graft vessel.

15. The method of claim 14, further comprising slicing the distal end of the graft vessel.

16. The method of claim 14, further comprising connecting the clamp assembly to a distal anastomotic tool.

17. The method of claim 1, further comprising viewing the anastomosis sites during the procedure.

18. The method of claim 1, further comprising performing at least one additional sutureless proximal anastomosis and at least one additional sutureless distal anastomosis.

19. A method for performing closed-chest surgery on a patient to connect a graft vessel to target vessels, comprising:

cutting at least one opening in an intercostal space of the patient;
performing a proximal anastomosis between the graft vessel and one target vessel,
utilizing an at least partially splittable tool inserted through one opening;
and
performing a distal anastomosis between the graft vessel and another target
vessel, utilizing a tool inserted through one opening.

20. A surgical tool for performing an anastomosis, comprising a splittable crown at the distal end of the tool.

21. The surgical tool of claim 20, further comprising at least one additional tube substantially coaxial with and slidable relative to said crown.

22. The surgical tool of claim 21, wherein retraction of said at least one additional tube allows the expander to split and release a graft vessel.

23. The surgical tool of claim 20, further comprising
a channel in said crown; and
a pin extending through said channel, wherein removal of said pin allows said
crown to split.

24. The surgical tool of claim 20, wherein said crown is hinged substantially longitudinally.

25. The surgical tool of claim 20, further comprising a splittable expander within said crown.

26. The surgical tool of claim 20, further comprising an anastomotic device connected to the distal end of said crown, said anastomotic device comprising:

a splittable discard section connected to said crown; and

a deployable section detachably connected to said discard section.

27. A surgical tool for performing an anastomosis, comprising a splittable expander at the distal end of the tool.

28. The surgical tool of claim 27, further comprising at least one additional tube substantially coaxial with and slidable relative to said expander.

29. The surgical tool of claim 27 wherein retraction of said at least one additional tube allows the expander to split and release a graft vessel.

30. A surgical tool for performing an anastomosis, comprising a shaft having an articulated end.

31. An integrated stabilizer, comprising

a head;

a distal anastomotic tool connected to said head; and

wherein said head stabilizes the surface of the heart relative to said distal anastomotic tool.

32. The integrated stabilizer of claim 31, further comprising an epicardial dissector connected to said head.

33. The integrated stabilizer of claim 31, wherein said epicardial dissector comprises a rotatable blade movable relative to the surface of the heart.

34. The integrated stabilizer of claim 31, wherein said head stabilizes a portion of the heart relative to said distal anastomotic tool by tracking the motion of the beating heart.

35. The integrated stabilizer of claim 31, wherein said head stabilizes a portion of the heart relative to said distal anastomotic tool by engaging both the chest wall and the heart and tensioning a portion of the surface of the heart.

36. The integrated stabilizer of claim 31, further comprising attachment structures for anchoring said head to the heart during the anastomosis procedure.

37. The integrated stabilizer of claim 36, wherein said attachment structures comprise clips deployable from said head.

38. The integrated stabilizer of claim 37, wherein said head further comprises a plurality of clip deployers, and wherein said clips are deployed from said clip deployers.

39. The integrated stabilizer of claim 36, wherein said attachment structures comprise at least one suction port.

40. The integrated stabilizer of claim 31, wherein said head further comprises at least one cam path defined therein, and wherein said distal anastomotic tool further comprises at least one cam follower engaging each said cam path.

41. The integrated stabilizer of claim 31, further comprising at least one cable connected to said distal anastomotic tool, said cable configured to actuate said distal anastomotic tool.

42. The integrated stabilizer of claim 31, further comprising a viewing apparatus connected to said head for viewing the distal anastomotic site.

43. The integrated stabilizer of claim 42, wherein said viewing apparatus comprises an endoscope.

44. A surgical tool, comprising:

an integrated stabilizer; and

a linkage connected to said integrated stabilizer, said linkage switchable between

a substantially compliant state and a substantially noncompliant state.